DOCUMENT RESUME

ED 280 424 HE 020 276

AUTHOR Kalsbeek, David H.
TITLE Linking Learning Style Theory with Retention Research: The TRAILS Project. AIR 1986 Annual Forum Paper.
PUB DATE Jun 86
NOTE 22p.; Paper presented at the Annual Forum of the Association for Institutional Research (26th, Orlando, FL, June 22-25, 1986).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; Academic Aptitude; Academic Persistence; *Aptitude Tests; *Cognitive Style; *College Students; Grade Point Average; Higher Education; Institutional Research; Majors (Students); Personality Measures; *Personality Traits
IDENTIFIERS *AIR Forum; *Myers Briggs Type Indicator; Saint Louis University MO; Tinto Theory; TRAILS Project

ABSTRACT

The Myers-Briggs Type Indicator (MBTI), a measure of personality type and learning style, was used at Saint Louis University in the TRAILS (Tracking Retention and Academic Integration by Learning Style) Project. In addition to considering links between learning styles and student academic achievement and aptitude, MBTI was used to identify discrete academic populations and to assess persistence patterns. MBTI preference indices consist of extraversion/introversion, sensing/intuition, thinking/feeling, and judgment/perception. Certain MBTI learning styles were disproportionately represented in certain academic fields (e.g., the most abstract and reflective learning style was most common in the arts and sciences majors). Performance on aptitude measures differed by MBTI personality types (e.g., students with the most concrete and active style scored lowest). It was also found that the greater the preference for intuition and for introversion, the better the first-term grade point average (GPA), and the greater the preference toward the judging mode, the better the GPA. Using MBTI indicators enables college researchers to assess both proxy measures of social and academic integration and the cognitive and affective processes that influence this integration. (SW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED280424

LINKING LEARNING STYLE THEORY WITH RETENTION RESEARCH :

The TRAILS Project

by David H. Kalsbeek
Assistant Vice President for Student Development
and Director of Student Life Studies
Saint Louis University

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

✓ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

AIR

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

paper presented at the
Association for Institutional Research Forum
Orlando, Florida

June 23, 1986

HE 020 276

for Management Research, Policy Analysis, and Planning

This paper was presented at the Twenty-Sixth Annual Forum of the Association for Institutional Research held at the Marriott Orlando World Center, Orlando, Florida, June 22-25, 1986. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Ann K. Dickey, Chair
Forum Publications Editorial
Advisory Committee

LINKING LEARNING STYLE THEORY WITH RETENTION RESEARCH:
The TRAILS Project

ABSTRACT

Tinto's model suggests that the critical factor in retention is the integration students experience with the campus' academic and social environments. The Myers-Briggs Type Indicator (MBTI), a measure of Jungian personality type, identifies basic cognitive functions and preferred approaches to learning that affect this integration. The TRAILS project (Tracking Retention and Academic Integration by Learning Style) incorporates students' MBTI profiles in institutional enrollment research and has found that it relates to aptitude scores, academic achievement, choice of major and attrition. Given the many applications of the MBTI in retention interventions, including the MBTI in retention research ensures the usefulness of the research outcomes.

LINKING LEARNING STYLE THEORY WITH RETENTION RESEARCH :
The TRAILS Project

INTRODUCTION: Learning Style and the Tinto Model of Student Persistence

Though retention and attrition are very complex issues with many intervening variables and factors, a theoretical framework or a model offers a common ground for discussions, research and action. In a summary of existing retention models, Bean (1982) explains,

> A model of student attrition is a representation of the factors presumed to influence decisions to drop out of an institution. The model identifies the interrelationships among the various factors and the relationships between these factors and the dropout decision.

In the same volume, Pascarella (p. 1) suggests that attrition models are particularly useful for institutional researchers since the models provide "a parsimonious guide to the selection of variables and to their relationships in student persistence/withdrawal behavior. One such model of student attrition has been developed by Tinto (1975) and his particular model has been widely cited and tested (Bean, 1982). Tinto suggests that the critical factor in retention is the degree of congruence between the needs, interests, abilities, expectations and commitments of the students on the one hand and the academic and social systems of the specific college or university. Every student inevitably experiences some degree of integration or "fit" with the institutional environment, both academically and socially. Tinto's model suggests that it is this degree of integration experienced by each individual student which is manifested in the student's enrollment choices. When dropout is viewed as an outcome of such a process, then the appropriate focus of

retention research is the nature of the interaction of the individual student with the campus environment.

If, as Tinto suggests, the key factor in retention is the integration experienced by individual students with the unique academic and social dimensions of the campus climate, then it is important to understand the cognitive and affective processes students use in negotiating the academic and social environments of the university or college. One framework for understanding these processes is provided by the personality theory of Carl Jung (1923) which serves as the conceptual foundation for the Myers-Briggs Type Indicator (MBTI) (Myers and McCaulley, 1985), a widely-used personality assessment instrument. The theory underlying the MBTI suggests "that much seemingly random variation in behavior is actually quite orderly and consistent, being due to basic differences in the way individuals prefer to use their perception and judgment" (Myers and McCaulley, 1985, p.1). The MBTI contains four separate scales or indices; each index reflects one of four basic preferences regarding what people attend to in any given situation (perception) and how they draw conclusions or make decisions about what is perceived (judgment). These four indices are outlined in Table 1.

INSERT TABLE 1 HERE

The four indices or dimensions of the MBTI have been related to numerous other psychological and academic measures which suggest that one use of the MBTI is as a measure of a student's learning style (Myers and McCaulley, 1985; Lawrence, 1984). Learning style can be understood as a person's preferred approach to information processing, idea formation and decision making, the attitudes and interests that influence what is attended to in a learning situation, and a disposition to seek learning environments compatible with

these personal preferences (Lawrence, 1984). Two of the dimensions of the MBTI interact to form a useful four-fold typology of learning style (Lawrence, 1979), specifically the Introversion(I)-Extraversion(E) and the Sensing(S)-Intuition(N) indices. The learning style typology is presented in Table 2.

INSERT TABLE 2 HERE

Both the theory and the existing research with the MBTI suggest that it can be one effective framework for making sense of the unique processes students prefer to use in dealing with their college experience. The MBTI provides important information about a student's natural interests, commitments and values, work habits and especially learning styles. Therefore, it seems that in one single profile it may offer very useful data regarding some personality processes and preferences affecting a student's academic and social integration with specific campus climates. The MBTI offers to institutional researchers one means of identifying important psychological factors that may affect the integration and in turn affect enrollment choices of students.

The MBTI also allows researchers to describe the prevailing climates of certain social and academic environments. A number of theorists (Walsh, 1973) suggest that it is the prevailing or dominant characteristics of student groups that in effect determine the essential nature of campus environments. By describing a specific population of students using MBTI dimensions, one can assess the degrees of congruence various types of students may experience within that prevailing academic and social climate of a campus. In addition, the MBTI profile of the faculty in a given department may describe in part the academic challenges faced by students in that department and the degree of integration or fit different types of students may experience in that

department. In short, the MBTI is one framework for understanding both sides of the interaction equation; it can describe both the individual student and dimensions of the environment encountered by that student. This person-environment interaction is a particularly important part of enrollment management research (Hossler, 1984).

The purpose of this paper is to introduce one model that has been used to integrate measuress of student learning characteristics with institutional enrollment research. The following discussion will briefly address four specific retention research issues and present preliminary data pertaining to :

a) Using the MBTI to Describe Discrete Academic Populations

b) The Relationship of The MBTI and Measures of Academic Aptitude

c) The Relationship of the MBTI and Academic Achievement

d) Using the MBTI to Understand Persistence Patterns

The TRAILS Project: An Overview

The TRAILS project (Tracking Retention and Academic Integration by Learning Style) is an institutional research effort at Saint Louis University in which students' MBTI scores are merged with other student data such as ACT/SAT scores, high school grade point average, and demographic factors. Each subsequent academic term, data such as the student's declared major and GPA and enrollment status are entered in the database. By maintaining such records in a cumulative database, institutional researchers can readily answer questions such as: What types of learners tend to gravitate to certain majors? How are MBTI preferences related to aptitude measures? How well do different types of learners do in certain schools or majors? Do some types of learners do better early in their academic work than in subsequent studies? How is student learning style related to drop-out?

Population Descriptions

There is an extensive body of research with the MBTI which describes specific student populations, especially in academic settings. [McCaulley,1978; Myers, 1980; Myers & McCaulley, 1985]. The theory and research suggests that different types of students are disproportionately represented in certain academic disciplines because the demands and rewards of specific academic and career pursuits attract students with certain personality preferences. If any one academic major at an institution is considered an unique academic and social environment, then the MBTI profile of the students (as well as the faculty) is important environmental information.

Table 3 presents TRAILS data from Saint Louis University which illustrate the predominant learning style characteristics of several individual colleges at the University. Though all MBTI types are represented in each college, certain types are disproportionately represented in certain academic environments. For example, the IN learning style (the most abstract and reflective learning style) describes a greater proportion of learners in Arts and Sciences than in the other schools and U.S. population at large. The ES learner (the most active, concrete and pragmatic style) is most common in the Nursing student population and least common for the Nursing faculty. Myers-Briggs type profiles such as these are useful in assessing the learning climate of campus environments and in identifying issues of student academic integration.

INSERT TABLE 3 HERE

Academic Aptitude Measures

It is generally acknowledged that there is some relationship between type preferences and performance on standardized aptitude measures (Myers &

McCaulley, 1985). Myers (1980) and McCaulley and Natter (1974) discuss several reasons why intuitive learners may perform better than sensing learners on certain IQ and aptitude measures and cite some studies which illustrate these differences. The argument is often made that gifts of sensing learners cannot be measured by paper and pencil instruments, and that sensing students (especially extraverted sensing learners) are at a disadvantage on any timed examination which focuses on the ability to quickly manipulate symbols, see patterns and relationships between words and concepts, and so on. The TRAILS data clearly support these patterns; on both the ACT and the SAT, the IN types scored the highest, followed by the EN, IS and ES learning styles (Table 4).

INSERT TABLE 4 HERE

The TRAILS database includes continuous scores on each of the four MBTI indices which show the strength of the individual's preference on each index. This offers another analytic approach to institutional studies, namely the investigation of the linear relationship between variables (e.g. to see if the strength of preference for intuition is related to aptitude measures). Table 5 summarizes the results of a stepwise multiple regression wherein the strengths of preference on each MBTI scale are the independent variables and aptitude score is the dependent variable. The Sensing-Intuition scale emerges as the only significant predictor; the stronger the preference for Intuition, the higher the aptitude score.

INSERT TABLE 5 HERE

If there is a relationship between student learning style as assessed by the MBTI and performance on traditional academic aptitude measures, students with certain learning preferences may be more likely to be found in "remedial" or "special support" programs prescribed for students with low aptitude scores.

Table 3 showed the learning style profile for one such program (the "high-risk group) and showed that extraverted-sensing (ES) learners are over 1 1/2 times more likely to be found in this group than one would expect from the overall type distribution of the student body at large.

Academic Achievement

Academic achievement has a prominent role in any investigation of retention patterns; at some institutions, the inability of students to perform academically may be the single most important factor contributing to attrition. In the Tinto model, academic performance is one measure of academic integration and is an important consideration as students reassess their commitments both to the institution and to their educational objectives (Tinto, 1975). It is important to investigate the relationship of learning style to academic achievement in order to fully integrate the MBTI with the retention model.

INSERT TABLE 6 HERE

There is a relationship between strength of preference on three of the four MBTI indices and academic achievement in the first semester (GPA). Table 6 shows that the greater the preference for Intuition and the greater the preference for Introversion, the better the first term GPA. Also there is a relationship between the Judging/Perceiving preference and academic performance; the greater the preference for Judging, the better the GPA.

Institutional researchers often investigate the relationship between grades and aptitude measures in order to verify that the use of aptitude measures to screen students in the admissions process and to place students in appropriate course sections is a worthwhile and effective endeavor. Table 6 also reports the relationship of each MBTI index with first term GPA when

aptitude is also entered in the stepwise regression equation. The SAT score emerges as the best predictor and the Sensing-Intuition scale (which is the only scale significantly related to aptitude - see Table 4) does not enter the equation as a significant factor. Above and beyond the aptitude measure, however, three MBTI scales are significantly related to academic performance: preferences for Introversion, Judging, and Feeling all contribute significantly to academic performance in the first term even while considering aptitude tests scores.

In retention research, subsequent academic performance is as important as first term GPA since the purpose is to determine factors that contribute to students successfully persisting through a complete program of study at the institution. Because the TRAILS project is still in its infancy (beginning in 1982), the sample size for upperclass students is limited. Table 7 presents preliminary TRAILS data on the effect of learning style on academic achievement in the upper division curriculum for students in four specific colleges: Arts and Sciences, Business, Nursing, and Allied Health Professions. Using the fall semester GPA for juniors and seniors as the dependent variable and the four learning style groups as independent variables, oneway ANOVAs for each school show no significant differences by learning style.

INSERT TABLE 7 HERE

Attrition

The Tinto model suggests that dropout is the outcome of insufficient integration of the student with the social and academic environments of an institution. The theory underlying the Myers-Briggs suggests that students with different preferences will find different kinds of environments rewarding, supportive, challenging, and so on - all of which affect choices about

persistence. Comparing persisting to non-persisting populations while also considering the aptitude and achievement findings discussed above is the final objective of the TRAILS approach to retention research. Again, the sample size for non-persisters to date is limited; the data presented in Table 8 are results of preliminary analyses of Nursing school data and is intended to illustrate the TRAILS model.

INSERT TABLE 8 HERE

In the Nursing program, there may be a relationship between the Thinking-Feeling dimension and attrition. While students with a preference for Thinking comprise about 26% of the Nursing student group as a whole, they comprise 40% of the Nursing dropouts. Since there is no effect of this preference on academic aptitude, first term GPA or subsequent academic performance for Nursing students, the Thinking-Feeling dimension may relate to persistence indirectly through its effect on social integration (Pascarella, 1986).

DISCUSSION

The data presented in this overview suggest that at one institution certain personality characteristics affect student performance on aptitude tests, student interest in academic majors or careers, and first term academic performance. Though certain types of learners score significantly lower than others on the ACT and the SAT, there appear to be no differences between types of learners in upperclass academic achievement in the heart of their chosen curriculum, though such aptitude scores are used to determine the liklihood of academic success at the institution.

If certain types of learners tend to score lower on aptitude tests than other learners, the trend of declining board scores which is faced by many

institutions takes on new meaning. Available data suggest that an ever-increasing number of "sensing" students are entering American colleges and universities and that, contrary to 10 to 20 years ago, the majority of college students today have a sensing preference (Myers, 1980; Davis and Schroeder, 1983). Academic programs which have witnessed a decline in board scores might benefit from investigating shifts in the prevailing learning style of their students via the MBTI.

Knowing this relationship between type preferences and aptitude (as measured by standardized tests) enables researchers to make better sense of the academic performance of certain types of students in certain curricular areas. There is evidence that sensing learners may be the most successful students in certain academic pursuits (McCaulley, 1978) inspite of the fact that the sensing preference may lead to poorer scores on timed aptitude tests like the ACT, SAT, MCAT or GRE. Using such aptitude measures to screen students for admission may be a disservice to some students and also perhaps to the vitality and success of specific academic programs. In a broader perspective, the current trend in public policy to monitor the quality of undergraduate programs through comprehensive assessment of student learning outcomes tends to focus on the use of standardized assessment measures (National Governors Association Task Force on College Quality, 1985). Data on the relationship of learning style to aptitude test performance have implications for such policies at the institutional, state and federal levels.

The TRAILS approach to retention research fits well with the premises of the Tinto model and enrollment management research in general (Hossler, 1984) by enabling researchers to investigate the person-environment fit that is critical to understanding the persistence patterns of students. Incorporating personality indices such as those provided by the Myers-Briggs Type Indicator

in the research scheme allows institutional researchers to assess not only proxy measures of social and academic integration but the fundamental cognitive and affective processes that influence such integration. Such dynamics are likely to vary by institution (Pascarella, 1986) and the TRAILS project is one model for investigating these factors.

Most importantly, the TRAILS model provides information and insights that can readily be translated into institutional retention interventions. Educators have available an extensive body of literature (Hoffman and Betkouski, 1981) about appropriate educational interventions for different learners found to be "at risk" in specific academic and social environments on campus. The MBTI has been used successfully in career planning and academic advising (Pinkney, 1983; Myers and McCaulley, 1985), personal counseling (Provost, 1984; Jones and Sherman, 1979), in residence halls (Schroeder and Jackson, in press) and in instructional development programs (Jensen and DiTiberio, 1984). Educators familiar with the MBTI can make effective use of such data in a wide range of retention interventions including freshmen orientation to advising to faculty development (Beal and Noel, 1980). The necessary first step is to incorporate such personality measures in the institutional enrollment research endeavor so that appropriate areas for intervention can be targeted and actual intervention efforts can be evaluated. The TRAILS project is one model for designing retention studies which incorporate useful information for improving the quality of the social and academic experiences of students - and thereby improving campus retention.

TABLE 1 : THE FOUR PREFERENCE INDICES OF THE MYERS-BRIGGS TYPE INDICATOR

	Scale	Dimensions	Description of Preference
Preferred orientation to inner/outer world	EI	Extraversion (E)	: a person's preferred orientation is toward the outer world of people, events, activities, things;
		Introversion (I)	: a person's preferred orientation is toward the inner world of ideas and concepts;
Preferred mode of Perception	SN	Sensing (S)	: a preference for perceiving through the process of sensing; a preference for immediate experience, observable, concrete facts and happenings perceived though one or more of the five senses;
		Intuition (N)	: a preference for perceiving or becoming aware though the process of intuition; a preference for perceiving meanings, relationships, possibilities;
Preferred mode of Judgment	TF	Thinking (T)	: a preference for making judgments through impersonal, objective analysis on the basis of logical consequences and cause and effect;
		Feeling (F)	: a preference for making judgments on the basis of personal or social values and subjective criteria, weighing values and the importance of choices for oneself and for others;
Preferred manner of "lifestyle"	JP	Judgment (J)	: a preference for living in a planned and orderly way; a preference for a structured, predictable lifestyle and for regulating and controlling events;
		Perception (P)	: a preference for living in a flexible, spontaneous way, prefering to understand and adapt to events.

(from Myers and McCaulley, 1985)

TABLE 2 FOUR LEARNING STYLES IDENTIFIED BY THE MBTI

IN : a preference for becoming aware through intuition (N) with an introverted focus (I); this type of learner tends to be introspective and scholarly, interested primarily in ideas, theories, and depth of understanding. This tends to be the least practical of learning styles. Knowledge is considered important for its own sake. Referred to as an "Abstract/Reflective" style.

EN : a preference for becoming aware through intuition (N) with an extraverted focus (E); this type of learner tends to see possibilities as challenges to make things happen; they have wide ranging interests and like to explore new patterns and relationships. Knowledge is considered important for innovation. Referred to as an "Abstract/Active" style.

IS : a preference for becoming aware through the senses (S) with an introverted (I) focus; this type of learner tends to carefully test ideas to see whether they are supported by facts; they prefer to deal with what is real and factual in a careful, unhurried way. Knowledge is considered important to establish truth. Referred to as a "Concrete/Reflective" style or as "careful compilers."

ES : a preference for becoming aware through the senses (S) with an extraverted (E) focus; this type of learner tends to be active and realistic and learns best when useful applications are obvious; it tends to be the most practical, pragmatic learning style. Knowledge is considered important for its pragmatic value. Referred to as a "Concrete/Active" style.

(from McCaulley and Natter, 1974)

TABLE 3 PERCENTAGE DISTRIBUTIONS OF THE FOUR LEARNING STYLES

	% IN	% EN	% IS	% ES
TRAILS DATA AT SLU:				
ARTS & SCIENCE UNDERGRADUATES	21	31	21	27
BUSINESS UNDERGRADUATES	12	30	27	31
NURSING UNDERGRADUATES	9	33	19	40
NURSING UNDERGRADUATE FACULTY	55	27	9	9
COMPLETE TRAILS DATABASE	18	31	22	30
HI-RISK STUDENT GROUP	8	15	30	46
AMERICAN POPULATION ESTIMATES (from G. Lawrence, 1982)	10	20	20	50

TABLE 4 ONEWAY ANOVA OF APTITUDE SCORE (SAT) BY LEARNING STYLE

GROUP	N	MEAN SAT	ST. DEV.
IN	148	1110	184.7
EN	312	1052	177.1
IS	188	1008	224.1
ES	250	932	196.1
TOTAL	989	1019	203.6

F (3,894) = 30.5
p< .001

Scheffe Post Hoc Comparisons

	IN	EN	IS	ES
IN				
EN	*			
IS	*	*		
ES	*	*	*	

note: * denotes p < .05

TABLE 5

FOUR MYERS-BRIGGS INDICES AND ACADEMIC APTITUDE (SAT)
RESULTS OF A STEPWISE MULTIPLE REGRESSION

VARIABLE	B	R SQ	F
SENSING-INTUITION	.30	.08	22.96 **
EXTRAVERSION-INTROVERSION	.10	.09	2.86
THINKING-FEELING	-.06	.09	.95
JUDGMENT-PERCEPTION	.02	.09	.07

NOTE: ** denotes p < .05

TABLE 6 FOUR MYERS-BRIGGS INDICES AND FIRST TERM GPA ACADEMIC ACHIEVEMENT

I. RESULTS OF A STEPWISE MULTIPLE REGRESSION -without aptitude (SAT)

VARIABLE	B	R SQ	F
EXTRAVERSION-INTROVERSION	.24	.05	16.71 **
JUDGMENT-PERCEPTION	-.13	.06	4.47 *
SENSING-INTUITION	.13	.08	4.15 *
THINKING-FEELING	.10	.08	3.00

II. RESULTS OF A STEPWISE MULTIPLE REGRESSION - with aptitude (SAT)

VARIABLE	B	R SQ	F
APTITUDE SCORE (SAT)	.43	.18	67.35 **
EXTRAVERSION-INTROVERSION	.20	.22	13.85 **
JUDGMENT-PERCEPTION	-.14	.23	6.68 **
THINKING-FEELING	.13	.24	5.73 *
SENSING-INTUITION	.00	.24	.00

NOTE: * denotes p < .05
** denotes p < .01

TABLE 7

RESULTS OF FOUR ONEWAY ANOVAS FOR EACH COLLEGE:
MEAN UPPERCLASS GRADE POINT AVERAGE BY LEARNING STYLE

	Arts & Sciences		Business		Nursing		Allied Health	
LEARNING STYLE	n	mean	n	mean	n	mean	n	mean
IN	64	3.32	15	2.91	5	3.20	17	3.31
EN	82	3.26	42	2.93	23	3.37	30	3.64
IS	68	3.17	35	3.15	12	3.51	12	3.51
ES	75	3.22	42	3.04	25	3.26	37	3.48
TOTAL	289	3.24	134	3.02	65	3.34	96	3.50
F ratio		.53		1.03		.61		1.29
F prob.		.66		.38		.61		.28

TABLE 8 PERCENTAGE DISTRIBUTION FOR FOUR MYERS-BRIGGS DIMENSIONS
A PRELIMINARY COMPARISON

	% of Nursing Undergraduates Preferring:	% of Nursing Dropouts Preferring:
Extraversion	73	77
Introversion	27	23
Sensing	59	67
Intuition	41	33
Thinking	24	40
Feeling	76	60
Judgment	50	57
Perception	50	43

REFERENCES

Beal P. and L. Noel. What Works in Student Retention. Iowa City, Iowa: The American College Testing Program and the National Center for Higher Education Management Systems, 1980.

Bean, J. P. "Conceptual Models of Student Attrition: How Theory Can Help the Institutional Researcher," in E. Pascarella (Ed.), Studying Student Attrition. New Direction for Institutional Research, Vol. IX, No. 4, San Francisco: Jossey-Bass, 1982.

Davis, M., and C. Schroeder. "'New Students' in Liberal Arts Colleges: Threat or Challenge?" In J. Watson and R. Stevens (Eds.), Pioneers and Pallbearers: Perspectives on Liberal Education, Macon, GA: Mercer University Press, 1983.

Hoffman, J.L. and M. Betkouski. "A Summary of Myers-Briggs Type Indicator Research Applications in Education". Research in Psychological Type, Vol 3, 1981.

Hossler, D. Enrollment Management: An Integrated Approach. New York: The College Board, 1984.

Jensen, G. and J.K. DiTiberio. "Personality and Individual Writing Processes". College Composition and Communication. 1984.

Jones, J.H. and R. Sherman. "Clinical Uses of the Myers-Briggs Type Indicator." Research in Psychological Type. Vol. 2, 1979.

Jung, C.G. Psychological Types. London:Rutledge and Kegan Paul, 1923.

Lawrence, G. "A Synthesis of Learning Style Research Involving the Myers-Briggs Type Indicator." The Journal of Psychological Type, Vol. 8, 1984.

Lawrence, G. People Types and Tiger Stripes: A Practical Guide to Learning Styles. Gainesville, FL: Center for Applications of Psychological Type, 1979.

McCaulley, M. and F. Natter. Psychological (Myers-Briggs)Type Differences in Education. in F.L. Natter and S.A. Rollings (eds.) The Governor's Task Force on Disruptive Youth, Phase II Report. Gainesville, FL: Center for Application of Psychological Type, 1980.

McCaulley, M. Application of the MBTI to Medicine and Other Health Professions. Gainesville, FL: Center for Application of Psychological Type, 1978.

Myers, I. (with P. Myers). Gifts Differing. Palo Alto, CA: Consulting Psychologists Press, 1980.

Myers, I. and M. McCaulley. Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator. Palo Alto, CA: Consulting Psychologists Press, 1985.

National Governors' Association Task Force on College Quality. Hearing on Quality Assessment and Accountability in Undergraduate Education. St. Louis, MO, 1985.

Pascarella, E. "A Program for Research and Policy Development on Student Persistence at the Institutional Level." Journal of College Student Personnel, Vol 27, No 2, 1986.

Pinkney, J.W. "The Myers-Briggs Type Indicator as an Alternative in Career Counseling." in The Personnel and Guidance Journal, November, 1983.

Provost, J. A Casebook: Applications of the Myers-Briggs Type Indicator in Counseling. Gainesville, FL: Center for Application of Psychological Type, 1984.

Tinto, V. "Dropout from Higher Education: A Theoretical Synthesis of Recent Research." Review of Educational Research, 43 (1),1975, 89-125.

Walsh, W. B. Theories of Person-Environment Interaction: Implications for the College Student. Iowa City, Iowa: The American College Testing Program, 1973.